

## Serina Diniega, Ph.D.

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## Scientist, Jet Propulsion Laboratory

PhD '10, University of Arizona  
MS '04, International Space University  
BS '03, California Institute of Technology

### Summary

In all of my professional work, I am committed to growing myself and my team through inclusivity, strategic preparation, and collaboration. As a systems engineer at JPL, my work generally focuses on communication and technical development at the interface between groups (e.g., on Europa Clipper: between the scientists and engineers, or between investigations/subsystems, and in the Mars Program Office: between the Mars science community and the NASA Mars Exploration Program administrators). This focus on bringing disparate parts/perspectives together also comes into my science research (e.g., interpret surface changes as a record of interacting atmospheric and surface conditions). In addition to my technical work furthering robotic space exploration, I engage in much strategic planning at a range of levels, and with a range of people (including regularly collaborating with people much more senior than me, and in managing junior colleagues and >20 diverse students). Through this work, I have gained valuable experience in connecting detailed tactical planning to big-picture aims and much exposure to the broader science and programmatic aims of JPL, NASA, and the planetary science community.

- Has received ten JPL Bonus Awards from MPO, Europa Clipper, and my 39x line (Voyager, Mariner, Team), and two NASA Honors Awards for contributions to the reconnaissance/modeling campaign for Comet Siding Springs as it went past Mars.
- PI for NASA ROSES MDAP (2016-2019) and Co-I on numerous other NASA ROSES and internal JPL research efforts. (Pending in ROSES 2019: three PI proposals submitted to MDAP and SSW.)
- Invited to write book chapter and *Geomorphology* review paper on planetary surface processes.
- In the Mars Program Office, I have managed/mentored three systems engineers and an APX, collaborate regularly with senior members of the science and engineering community, and significantly contribute towards the planning and documentation of many meetings and NASA or MEPAG-chartered studies, including strategic preparation and communication to move the group towards consensus and a useful deliverable (e.g., report).
- My work with the Europa Clipper project has broadened my community and science exposure into the outer solar system and icy/ocean worlds, and I have gained important experience within Phases A-C of development of a large, strategic mission.
- I have served as Project Scientist of a Discovery mission proposal (Pandora) and two MPO/6x mission concept studies, and now am leading community-based efforts to advance in situ aeolian/meteorological measurements beyond Earth.

### Relevant Employment/Education Experience

Jet Propulsion Laboratory (JPL), Scientist & Group Supervisor	<i>started April 2020</i>
Jet Propulsion Laboratory (JPL), Scientist & Systems Engineer	2013-2020
JPL, NASA Postdoc, Planetary Geology and Geophysics (Advisor Sue Smrekar)	2010-2013
University of Arizona (UA), PhD in Applied Mathematics, minor in Planetary Science	2010
PhD Dissertation: Modeling Aeolian Dune & Dune Field Evolution	
International Space University (ISU; Strasbourg, France), MS in Space Studies	2004
Thesis: Regolith distribution model for sub-km ellipsoidal asteroids (@ JAXA)	
California Institute of Technology (Caltech), BS, with honors, Mathematics	2003

### Experience in scientific leadership (research & mission development)

- Invited by *Elsevier/Geomorphology* to write a review paper on "Modern Mars activity, driven by gravity, wind, and frost" (due June 2020).

- Invited to write a chapter for *Handbook of Space Resources* (due August 2020) on “Surface-atmosphere transport mechanisms and processes across planetary bodies.”
- Co-Chair for Ice and Climate Evolution Science Analysis Group (ICE-SAG; 2019 – 22-person team generated a >150pp report, important community reference).
- Lead Convener and SOC Organizer for 9<sup>th</sup> International Mars Conference (>600 attendees, at Caltech, July 2019).
- Lead for informal science discussions to advance in situ planetary aeolian and meteorological investigations.
  - Started as PI of *NASA Mission Concept Study proposal: Next-generation Planetary and Meteorological Investigation*, with 10 diverse (non-JPL) Co-Is. (Received positive feedback from selection officials.)
  - Now science lead for JPL strategic development of a small lander concept (SHIELD) to achieve that science, coordinating inputs from ~20 diverse planetary and terrestrial community members.
- Currently Co-I on: UK/NERC-US/NSF research grant to study dune formation (Mars Co-I); 2 JPL-strategic initiatives for spacecraft onboard processing (Mars, Europa; science Co-I).
  - PI for ROSES MDAP to study martian dune-alcoves activity (2016-2019); Co-I for ROSES MFRP to study linear gully formation (2016-2019)
  - Submitted 3 PI proposals in ROSES 2020 (MDAP to study seasonal frost on dunes; MDAP to study spider formation; SSW to study pitted terrains on Mars/Ceres/Vesta).
- Has advised >20 students in science research (2011-2020), with 6 then presenting the research at a professional conference and 3 who completed a related baccalaureate honors thesis.
- Served as Project Scientist for: Mars Program Office – Next Mars Orbiter Study (2016-17); JPL 6x study – martian moons lander mission concept (2015-16); Discovery Mission Proposal – Pandora, PI: Carol Raymond (2014-15)
- Invited presenter at GSA 2019, for Session T89, *The G.K. Gilbert Award Session: Thrilling Discoveries in Planetary Geology and Geophysics* (honoring Alfred McEwen): **Diniega, S.**, et al., Modern Mars activity, driven by gravity, wind, and frost, Ab. 219-7.)
  - Invited seminar speaker at Caltech/Kleigel Lectures in Planet. Sci. (2014), SETI Institute (2014), UC Santa Cruz/Geo. & Planet. (2014), USC/Geo. Sci. Honor Society (2016), Boise State Univ./Physics (2018, 2016), N Arizona Univ./Planet. Sci. (2019), Glendale CC (2020).
  - Keynote speaker at Coe College (Iowa) Physics Graduation dinner (2018), Arizona State Univ. Sonia Kovalevsky (women in mathematics) event (2016), California Mathematics Council Community Colleges South Annual Meeting (2013).
- Invited 1-2x annually to participate as science SME for JPL A Team and Team X studies of Mars system mission concepts (since ~2015).

#### Additional experience with managing people & projects

- JPL Planetary Geosciences Group Supervisor (started Apr 2020)
- Mars Program Office Lead Mars science systems engineer (Feb 2013-Mar 2020)
  - Key contributor to strategic planning and “institutional knowledge” of MPO/MEPAG.
  - Work in the last 2 years includes key organization of new & successful engagement with community (e.g., MEPAG Meeting 38 conversion to a fully virtual meeting, including community discussion of Decadal Survey white paper topics; MEPAG Meeting 36 forum; MEPAG virtual meetings and LPSC informal discussions) & facilitation of Mars inputs for next Planetary Decadal Survey; Ex officio member of Mars Architecture Strategy Working Group (MASWG); Overseeing 2020/2018/2015 MEPAG Goals document revisions.

- Critical Data Products Program Manager, including developing RFPs & oversight of ~8 subcontracts/\$500k per year; Acting MPO Science Office Manager, including oversight of \$2M/yr budget (2014-2018).
- Management of junior colleagues including training so as to pass over responsibilities.
- AAS DPS, Professional Climate and Culture Subcommittee (PCCS): Co-chair (since 2018), member (since 2017).
- JPL EarlyCareer PhD Core Committee (convened by the JPL Office of the Chief Scientist): Co-Chair (2016), Member (2015-16).
- JPL Advisory Council for Women: Chair 2014-2015, Membership Coordinator: 2012-2013.

#### Additional experience with mission development & operations

- Europa Clipper Mission Investigation Scientist for the imaging spectrometer (MISE), including definition and refinement of MISE measurement requirements
  - Currently Facilitator of Composition Thematic Working Group; was Facilitator of Clipper-Lander Study Reconnaissance Focus Group (2018-2020).
  - Serving as Project Science Representative within ongoing Energy Tiger Team (since Fall 2019)
  - Co-coordinator for Social Sciences Journal Club (to improve group collaboration and communication) and Equity/Diversity/Inclusion Group. (2015-pres.)
- Lead Science Co-I for SURP partnership with UMich Aerospace Engineering graduate and undergraduate core courses to develop secondary payload concepts. (2016-2019)
- Mars Reconnaissance Orbiter (MRO) Operations (2013-14): Payload Operations Specialist Team (POST) member, Mars Climate Sounder (MCS) Uplink Lead.

#### Additional science service

- CASSIS data reviewer for ESA archival (Spring 2020)
- Science organizing committee: Mars Enigmas (Oct 2020), 6<sup>th</sup> Planetary Dunes Wkshp. (was: May 2020), 7<sup>th</sup> Internat. Conf. on Mars Polar Sci. & Explorat. (Jan 2020), AAS DPS Fall Meeting (Oct 2018), Late Mars Wkshp. (Oct 2018), 6<sup>th</sup> ICMPSE. (Sept 2016)
- Manuscript Review (since 2011): Computer Physics Comm., Earth Surf. Proc. & Landforms, Geomorphology, Icarus (top reviewer in 2015), Nature Geoscience, Planet. & Space Sci.
- Grant Review (panelist, since ~2014): NASA GSRP, NASA SSW, NASA MDAP

#### **Publications (\*Peer-reviewed)**

- \***Diniega, S.**, I.B. Smith, 2019, High-priority Science Questions identified at the Mars Workshop on Amazonian and Present-Day Climate, *Planet. & Space Sci.* (special issue: Amazonian Climate), **182**, 104813, [doi:10.1016/j.pss.2019.104813](https://doi.org/10.1016/j.pss.2019.104813).
- Report from the Ice and Climate Evolution Science Analysis group (ICE-SAG), 2019, Chaired by **S. Diniega** and N.E. Putzig, 157 pages posted July 8, 2019, by the Mars Exploration Program Analysis Group (MEPAG) at [link](#).
- \*Hendrix, A, T Hurford, **et al.** (2019) The NASA Roadmap for Ocean Worlds (ROW), *Astrobiology*, 19(1), [doi:10.1089/ast.2018.1955](https://doi.org/10.1089/ast.2018.1955).
- \*Smith, I., **S. Diniega**, et al., 2018, Introduction to the Special Issue on Mars Polar Science and Exploration: Conference Summary and Five Top Questions, *Icarus* (special issue: Mars Polar Science), [doi:10.1016/j.icarus.2017.06.027](https://doi.org/10.1016/j.icarus.2017.06.027).
- \***Diniega, S.**, S. Sangha, B. Browne, 2018, Using satellite imagery to identify and analyze tumuli on Earth and Mars, *Earth & Planet. Sci. Lett.*, **482**, 52-61, [doi:10.1016/j.epsl.2017.10.028](https://doi.org/10.1016/j.epsl.2017.10.028).
- \***Diniega, S.**, et al., 2018, Dune-slope activity due to frost and wind, throughout the north polar erg, Mars, *Geologic Society London* (special issue "Martian Gullies and their Earth Analogues"), **SP467**, [doi:10.1144/SP467.6](https://doi.org/10.1144/SP467.6).

- \*Dundas, C.M., A.S. McEwen, **S. Diniega**, et al., 2018, The formation of gullies on Mars today, *Geologic Society London* (special issue Martian Gullies and their Earth Analogues), SP467, [doi:10.11144/SP467.5](https://doi.org/10.11144/SP467.5).
- \***Diniega, S.**, et al., 2017, Our evolving understanding of aeolian bedforms, based on studies of different worlds, *Aeolian Research* (special issue: Planetary Dunes), **26**, 5-27, [doi:10.1016/j.aeolia.2016.10.001](https://doi.org/10.1016/j.aeolia.2016.10.001).
- Prockter, L, **et al.**, 2017, The Value of Participating Scientist Programs to NASA's Planetary Science Division. Posted by LPI at [link](#).
- Diniega, S.**, J Tan, MS Tiscareno, E Wehner, 2016, Senior Scientists Must Engage in the Fight Against Harassment, *EOS Opinion*, at [link](#).
- Report from the Next Orbiter Science Analysis Group (NEX-SAG) (2015), Chaired by B. Campbell and R. Zurek, 77 pages posted by the Mars Exploration Program Analysis Group (MEPAG) at [link](#).
- \*Dundas, C.M., **S. Diniega**, A.S. McEwen (2015). Long-Term Monitoring of Martian Gully Formation and Evolution with HiRISE. *Icarus* (special issue: Dynamic Mars), 251, 244-263, [doi:10.1016/j.icarus.2014.05.013](https://doi.org/10.1016/j.icarus.2014.05.013).
- \*Hansen, C.J., **S. Diniega**, et al. (2015). Agents of change on Mars' northern dunes: CO2 ice and wind. *Icarus* (special issue: Dynamic Mars), 251, 264-274, [doi:10.1016/j.icarus.2014.11.015](https://doi.org/10.1016/j.icarus.2014.11.015).
- \*Carling, G., **et al.** (2015), Temperatures, thermal structure and behavior of eruptions at Kilauea and Erta Ale volcanoes using a consumer digital camcorder. *Geo. Res. J.*, 5, 47-56, [doi:10.1016/j.grj.2015.01.001](https://doi.org/10.1016/j.grj.2015.01.001).
- \***Diniega, S.**, C.J. Hansen, J.N. McElwaine, C.H. Hugenholtz, C.M. Dundas, A.S. McEwen, M.C. Bourke (2013). A new dry hypothesis for the formation of Martian linear gullies. *Icarus*, **225**(1), 526-537. [doi:10.1016/j.icarus.2013.04.006](https://doi.org/10.1016/j.icarus.2013.04.006).
- \***Diniega, S.**, S.E. Smrekar, S. Anderson, E. Stofan (2013). The influence of temperature-dependent viscosity on lava flow dynamics. *JGR*, **118**(3), 1516-1532. [doi:10.1002/jgrf.20111](https://doi.org/10.1002/jgrf.20111).
- \*Dundas C.M., **S. Diniega**, C.J. Hansen, S. Byrne, A.S. McEwen (2012), HiRISE observations of seasonal activity and morphological changes in Martian gullies. *Icarus*, **220**(1), 124-143. [doi:10.1016/j.icarus.2012.04.005](https://doi.org/10.1016/j.icarus.2012.04.005).
- \***Diniega, S.** & 17 co-authors (2012). Mission to the Trojan Asteroids: lessons learned during a JPL Planetary Science Summer School mission design exercise. *Planet. & Space Sci.*, **76**, 68-82. [doi:10.1016/j.pss.2012.11.011](https://doi.org/10.1016/j.pss.2012.11.011).
- \*Bridges, N.T., M.C. Bourke, P.E. Geissler, M.E. Banks, C. Colon, **S. Diniega**, M.P. Golombek, C.J. Hansen, S. Mattson, A.S. McEwen, M.T. Mellon, N. Stantzos, B.J. Thomson (2012), Planet-wide sand motion on Mars. *Geology*, **40**(1), 31-34. [doi:10.1130/G32373.1](https://doi.org/10.1130/G32373.1).
- \*Hansen, C. J., M. Bourke, N.T. Bridges, S. Byrne, C. Colon, **S. Diniega**, C. Dundas, K. Herkenhoff, A. McEwen, M. Mellon, G. Portyankina, N. Thomas (2011), Seasonal erosion and restoration of Mars' northern polar dunes. *Science*, **331**(6017), 575-578. [doi:10.1126/science.1197636](https://doi.org/10.1126/science.1197636).
- \***Diniega, S.**, S. Byrne, N.T. Bridges, C.M. Dundas, A.S. McEwen (2010), Seasonality of present-day Martian dune-gully activity. *Geology*, **38**(11), 1047-1050. [doi:10.1130/G31287.1](https://doi.org/10.1130/G31287.1).
- \*Dundas, C.M., A. S. McEwen, **S. Diniega**, S. Byrne, S. Martinez-Alonso (2010), New and recent gully activity on Mars as seen by HiRISE. *Geophys. Res. Lett.*, **37**, L07202. [doi:10.1029/2009GL041351](https://doi.org/10.1029/2009GL041351).
- \***Diniega, S.**, K. Glasner, S. Byrne (2010), Long scale evolution of aeolian sand dune fields: influences of initial conditions and dune collisions. *Geomorphology* (special issue: Planetary Dunes), **121**, 55-68. [doi:10.1016/j.geomorph.2009.02.010](https://doi.org/10.1016/j.geomorph.2009.02.010).
- \*Pelletier, J.D., T. Engelder, D. Comeau, A. Hudson, M. Leclerc, A. Youberg, **S. Diniega** (2009), Tectonic and structural control of fluvial channel morphology in metamorphic core complexes: The example of the Catalina-Rincon core complex, Arizona. *Geosphere*, **5**, 385-407. [doi:10.1130/GES00221.1](https://doi.org/10.1130/GES00221.1).
- \*Hey, R.N., F. Martinez, **S. Diniega**, D.F. Naar, J. Francheteau, Pito93 Scientific Team (2002), Preliminary attempt to characterize the rotation of seafloor in the Pito Deep area of the Easter

Microplate using a submersible magnetometer. *Marine Geophysical Research*, **23**, 1-12.  
[doi:10.1023/A:1021257915420](https://doi.org/10.1023/A:1021257915420).

## LPSC & ICAR 2020 Abstracts (~representative of recent science work)

### LPSC (Lunar and Planetary Science Conference)

- **Diniega, S.**, et al. The importance and feasibility of in situ martian aeolian and meteorological investigations, Ab. 2434. (science/mission concept development)
- Widmer, J.M., **S. Diniega**, P.O. Hayne, a case for small spacecraft missions to Mars: Enabling future surface investigations, Ab. 2608. (student work/mission concept development)
- Blaney, D., et al., The Mapping Imaging Spectrometer for Europa (MISE): Science and instrument development status, Ab. 1582. (Europa Clipper work)
- Widmer, J.M., **S. Diniega**, et al. Updating the spatial extent and timing of seasonal frosts and snowfall in the northern mid-latitude region of Mars, Ab. 2295. (student work)
- Banfield, D., **et al.**, 2020 Revision of the MEPAG Goals Document, Ab. 2474. (MPO work)
- **Diniega, S.**, et al., Why and how to write a useful "code of conduct" for planetary conferences and mission teams, Ab. 2482. (improving the science community)
- Rathburn, J.A., **et al.**, Why is equity, diversity, and inclusion (EDI) so difficult for scientists?, Ab. 1594. (improving the science community)
- Schindhelm, R., **et al.**, Making planetary science more inclusive: The Division of Planetary Sciences Professional Culture and Climate Subcommittee (PCCS), Ab. 1627. (improving the science community)

### ICAR (International Conference on Aeolian Research)

- Diniega, S., et al., Protodunes on Mars.
- Diniega, S., et al., The importance and feasibility of in situ martian aeolian & meteorological investigations.